

BOOK REVIEWS

Sustainable Small-scale Forestry: Socio-economic Analysis and Policy, by S.R. Harrison, J.L. Herbohn and K.F. Herbohn, eds. (2000), New Horizons in Environmental Economics Series, Edward Elgar, Cheltenham, UK, 247 pp.

Sustainable Small-Scale Forestry is published in the Elgar *New Horizons in Environmental Economics* series. Small-scale forests provide direct benefits to their owners and considerable indirect benefits to society beyond to what the owners can count on. In an economic sense, this means that small-scale forests are undersupplied relative to what would be the optimal level. Therefore public policy should be to increase the supply of small-scale forests. The main objective of this book, then, is to provide a policy and analysis background for promoting small-scale forests.

Given the diversity of forest types, growing conditions, ownership patterns, customs, and laws around the world, there is no single definition of small-scale forestry. According to the editors it could be ownerships between five and 500 ha, with individual, family or community owners, but not industrial or government. The authors use many characteristics to describe small-scale forestry such as size of ownership, type of forest, forest use, length of rotation, products, ownership, labor source, plantation design, harvesting system and regeneration method used. Although these vary from country to country and region to region, there is a clear difference between forestry in small-scale enterprises, and larger industrial or public forestry.

The treatment of the subject is from a decidedly social science and economics point of view. Various aspects from timber valuation to carbon sequestration and credits trading are covered. There is even a highly technical chapter on the rules of accounting treatment of forest receipts in various countries. The book doesn't deal with ecological issues as they relate to small-scale forestry. Instead the book takes ecological goals such as increasing timber and non-timber forest products, biodiversity or carbon sequestration and evaluates them through various social science measures. The book concentrates on planted forests rather than naturally established forests.

The editors (who wrote a significant portion of the book) are researchers at the Rainforest CRC (Cooperative Research Centre) in north Queensland, Australia. This book grew out of their research on this subject and their contacts with collaborators around the world. Many of the examples in the methodology section of the book come from Australia and New Zealand.

The book consists of four sections: Setting the scene; Social and economic considerations; Encouraging small-scale forestry; and an Overview and Summary. In the first section the editors set the stage by describing the role of small-scale forests, comparing and contrasting them to industrial forests and agricultural

production. Although plantations in industrial forests greatly exceed small-scale forests in terms of wood productivity, they are not always socially acceptable to local populations who want trees for different uses such as construction lumber, food products, wildlife habitat, and aesthetics. In the overview of the very diverse types of small-scale forest systems the authors do a thorough analysis of the timber and non-timber benefits these can provide. They also give a good overview of the socio-economic and policy issues involved in managing these forests, especially in the context of overall farm policy.

In the social and economic considerations section, the book tries to cover the range of current issues in how to value the contributions of small-scale forestry and include them in an overall sustainable economic development framework. Some of the topics covered include: financial performance, total economic value, timber production and biodiversity, landscape amenities and recreation, carbon-marketing opportunities, and accounting and reporting of forest enterprises. In such a small amount of space the book cannot cover any one technique in great detail. A reader would not, for example, learn how to perform non-market goods valuation. Instead the reader would learn what are the methodologies currently in use and how they fit together.

The limitations and difficulties with each technique are also covered. For example, the book explores the definition of biodiversity, then discusses the benefits of biodiversity and how they can be incorporated into a plantation design. The discussion raises questions of how the costs of biodiversity are borne by the landowner, but the benefits go to society at large. At first it seems that the discussion pertains only to large plantations, but eventually it is related to small-scale forest plantations. An interesting question is whether communities can afford biodiversity or whether they should concentrate on production when larger reserves can be established nearby. The discussion concludes that we don't have strong enough analytical frameworks to evaluate biodiversity in plantations and more work needs to be done.

Of particular interest is the attempt to measure the total economic value of small-scale forests. With such a diversity of ownership types, forest types, and policies around the world, there is no generally accepted way to value the whole contribution of the forest. There is even a great deal of debate over which components of the forest should be included. The Total Economic Value framework includes both use and non-use components. Use values includes direct use (forest products), indirect use (forest functions), and option values (essentially future uses). Non-use values include bequest values and existence values (those independent of human wants). Although even this framework leaves a lot to the details of which individual valuation methods should be used, it does provide a way to perhaps unify the different values in a generally accepted way across ownerships.

Perhaps of greatest interest are the country examples. The editors have included a good mix of countries, both developing (The Philippines, India, and China) and developed (New Zealand, Australia, USA and the UK). There is also an attempt to cover national and regional policies in the European Union and the United States, as well as very localized policies such as the State of Baden-Württemberg in Germany. The coverage is by no means comprehensive. For example, no African or South American countries are included.

The country discussions illustrate how important tax policy is as an incentive for forestry investment. Both New Zealand and the United Kingdom, with very different land ownership patterns and available land, have promoted forestry with tax incentives. However, tax policies change with political winds. For example, New Zealand laws allowed the deduction of forestry costs. When this was removed from the law the number of plantings dropped considerably and the decision was reversed. Establishment and maintenance cost subsidies have also proven to be critical in promoting forestry. In the UK, small-scale owners have provided the bulk of hardwood plantings that have occurred in the last 10 years instead of the conifers that were previously planted in the large-scale Forestry Commission plantations.

On the other hand, success in the Philippines has been mixed. There have been many efforts over the years to promote reforestation. However, the wide gap between the stated government policy and its implementation on the ground has created problems. There are a number of technical and financial impediments to the success of small-scale forestry, including species selection, seedling survival and transport, property rights and harvested wood prices. On the positive side, there is a widespread acknowledgement of the need to reforest. There are many groups developing innovative methods of community forestry throughout the very diverse archipelago.

Another interesting example is the vast reforestation effort occurring in China to reclaim deserts and desertified areas. More and more the effort is shifting from state financed and controlled programs to a diversity of mixed state and private sector efforts with underlying long-term support and financing from the state.

Given the size of the United States and the diversity of forest ownerships and forest types, the chapter on the US can only highlight the situation. It covers federal policy towards non-industrial private forests or NIPF's as they are known in the US. However, there is no room to cover differences between states and regions in any degree of detail. I suspect the situation is the same for other large countries covered such as India and China.

In conclusion, this book provides a useful summary of the current state of social and economic analysis of small-scale forests. The country illustrations are useful, but only give snapshots of parts of the world, not a comprehensive picture. Given its brevity, the book gives an excellent overview the issues affecting small-scale forest enterprises and some of the economic and policy tools necessary to promote tree planting. Its coverage of methodology is not detailed enough to make it useful as a textbook. The country analyses are interesting, particularly as an overview of countries or regions that are new to individual readers. Its greatest value is as a reference for forestry workers and policymakers, and as a summary of current thought and methodology in the field pointing to more detailed resources.

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Production, Privatisation and Preservation in Papua New Guinea Forestry, by C. Hunt, ed. (2001), Instruments for Sustainable Private Forestry Series, International Institute for Environment and Development, London, 126 pp.

This book is one in a series commissioned by the International Institute for Environment and Development and supported by the UK Department of International Development and the European Commission. The series comprises both thematic and country studies, which adopt the premise that governments, faced with limited resources, must find ways to ensure the private sector manages forests so as to maximize benefits to society.

In the book synopsis on the back cover it is noted that the forests of Papua New Guinea (PNG) represent an enormous timber resource and a globally significant storehouse of carbon and biological diversity. Heated debate has arisen about forest policy, and the shares of resource rents going to indigenous communities, timber companies and government. The forest industry is at a crossroads, with decisions to be made about whether further industrial forestry should be allowed, and how to distribute benefits from forests equitably. The book seeks to identify the instruments and arrangements to enhance sustainability (economic, social and environmental) in the utilization and conservation of PNG forests.

The book consists of five main chapters, plus a useful executive summary and a short conclusions chapter. Three of the main chapters are written by Colin Hunt, who was an economist at the PNG National Research Institute at the time the manuscript was prepared. Chapters have been contributed by Norman Oliver, ATK Associates, Port Moresby (and formerly PNG lands administrator), and Geoffrey Stocker, consultant and former head of the PNG Forest Research Institute.

Chapter 1 introduces various issues concerning forest ownership and the institutional environment for forest utilization in PNG. It is noted that about 70% of the land area in PNG is covered by primary forests, and there is still about 22 M ha of forest suitable for commercial exploitation. About half of this has been acquired by the Papua New Guinea Forest Authority, of which 6.1 M ha are allocated under permit for logging operations, by about 23 companies at 90 sites. Little plantation forestry exists in PNG. The abundant native forest resource, proximity to Asian markets and low labour cost provide comparative advantage for timber export. PNG is the fourth largest log exporter in the Asia-Pacific region, and log exports contributed \$US100 M annually to the government's consolidated revenue in 1996 and 1997, though the revenue halved in 1998-2000 due to the Asian financial crisis. Relatively little timber processing takes place in PNG. The destructive nature of commercial logging is noted, in which more than 70% of the trees in the original forest do not survive the following 10 years, and regeneration is by less valuable species. There is increasing international recognition of the need for forest conservation in PNG, with funding from the Global Environmental Facility for biodiversity conservation and interest by pharmaceutical companies in bio-prospecting.

Hunt notes that only 2.8% of the country is under National Park or other protected status, due to the dominance of customary land tenure and the limited financial ability of the government to manage protected areas. An interesting discussion is

provided on customary land tenure, which covers about 97% of the PNG land area, and is upheld by the national constitution, though for the most part, is undefined and unrecorded. This tenure could be expected to promote sustainable forest use, but difficulties arise in establishing ownership over commonly held forests and in transferring financial incentives to the owners without dispute.

Chapter 2 critically evaluates industrial forest harvesting practices and performance. Forest Management Agreements allow the PNG Forest Authority to acquire timber rights from customary owners. Sustainable yield principles specify a cutting cycle of 35 to 40 years. The difficulties in resource assessment, and in dealing with powerful logging companies, is noted. Implementation of the Logging Code of Practice 'has been patchy' and the code may be 'of little consequence to logging companies bent on cost cutting' (p. 33). Chapter 2 also examines design of forest revenue systems, including the question of whether the forestry resource rent tax should be designated in PNG kina or US dollars. When timber prices fell during the Asian financial crisis, log prices in US dollars fell. However, the resource rent tax was fixed in kina, and with the devaluation of the kina relative to the US dollar, the local currency price of logs rose. With a progressive log tax scale in relation to timber price, this increased the government's take, but crowded out the shares of other stakeholders. Evidence suggests that transfer pricing to the extent of 10% of the log price has taken place in log exports to Japan. A proposal is advanced for an improved log tax system, with a tax rate reflecting the social costs of log harvesting and related to levels of resource rent.

In Chapter 3, Norman Oliver examines the 'lease, lease-back' system of resource access in PNG, and its potential use to allow timber companies (including foreign-based ones) to gain access to PNG forests. The State is the only non-citizen body which may enter into dealings over customary land, and the only legal machinery to allow development on customary land is the *Land Tenure Conversion Act 1963*, which is 'unworkably cumbersome and slow' (p. 59). The State must bring customary land under the *Land Registration Act* if it is to issue a registered negotiable legal title. A mechanism to overcome this impasse is that the State leases land from the customary owners for an agreed period, then 'issues back to the landowners a lease, registered under the *Land Registration Act*, for the same period of time less one day' (p 60). The arrangement is currently practiced for the palm oil industry in West New Britain Province. While the procedural difficulties are considerable, this type of arrangement has potential for sustainable forest utilization where it is acceptable to customary landowners.

In Chapter 4, Hunt examines the benefits of certification for small-scale forestry (or eco-forestry). 'The certification scheme being adopted and promoted in Papua New Guinea, and which imposes strict rules concerning customary tenure, is that of the Forest Stewardship Council (FSC)' (p. 75). Hunt further notes that the benefits of certification are limited, and its costs place additional burden on agencies and NGOs subsidizing this activity, and only a handful of eco-forestry operations are currently certified (though many others aspired to obtain certification). The chapter provides useful modeling and analysis of the benefits and costs of certification. The prospects for certification of large-scale private forestry are also examined, and it is noted that three private harvesting companies in PNG are in the early stages of application to become FSC certified.

Geoffrey Stocker in Chapter 5 explores the benefits which might arise from substitution of government services to forestry by the private sector. 'The goal is on shifting away from a bureaucracy where the emphasis is on control and exercise of power to one where the emphasis is on delivery of services needed for development, and where rewards and sanctions reflect performance' (p. 95). A first step is to identify the core activities of the Forest Authority, and those which lend themselves to outsourcing. Stocker notes that privatisation and outsourcing are high on the Morauta government's agenda, to help meet financial commitments and improve services, but are likely to be resisted by public servants on job security grounds. The potential for outsourcing activities of the National Forest Service – in areas of planning, inventory and acquisition; management; research; revenue collection; education; and legal and other services – are examined. It is concluded that the outsourcing of forestry research to universities and resource inventory and acquisition work to consultants offers most promise.

There is a clear risk that forests in PNG will be severely depleted as they have been in other tropical developing countries such as the Philippines and Indonesia. If these forests are to be protected, it will be necessary for the PNG government to finance their activities from other sources, and accept 'the strongly held view ... that no further logging concessions should be allocated' (p. 26). Further, 'the locking up on vast forest concessions for long periods of time when the economic future is unknown, and depriving landowners of timely and equitable benefits from the exploitation of their resource, is both economically and socially unjustifiable' (p. iii). The book appears to conclude that there would be sound prospects for sustainable forest use in PNG, particularly if stronger property rights were given to customary owners and small-scale forestry system in the country appropriately supported. Overall, this highly readable book makes a valuable contribution to understanding forest policy issues in a developing country which still has a major forest resource but faces great financial pressures to continue large-scale industrial logging.

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Trees, Water and Salt: An Australian Guide to Using Trees for Healthy Catchments and Productive Farms, by R. Stirzaker, R. Vertessy and A. Sarre, eds. (2002), Agroforestry Design Guidelines Series No. 1, Rural Industries Research and Development Corporation, Canberra, 159 pp, A\$27.

Salinity is a major environmental and land-use issue in Australia. Large tracts of previously productive land have been lost to farming due to rising salt, and water from major river systems are likely to become undrinkable if current trends continue. The planting of farm woodlots and hedgerows can be in some circumstances an important means of addressing this problem. This book provides a

timely coverage of the important role that small-scale or farm forestry can play in ameliorating past inappropriate clearing of agricultural landscapes.

The book comprises of nine multi-authored chapters which draw on research conducted over a four-year period by a team of scientists in the CSIRO and other Australian government agencies. The chapters have been well edited resulting in a similar and easy flowing style being present throughout the book.

Chapter 1 introduces the problem of salinity in Australia and the issues associated with restoring tree cover in the landscape for control over salinity and waterlogging. This chapter also contains an excellent overview of subsequent chapters. Chapter 2 provides a comprehensive coverage of the basic hydrological principles relevant to later sections of the book, in easy-to-understand language and avoiding excessive use of symbolic representations. The only real criticism of this chapter is that the scant coverage of rising salt. The preceding sections all lead towards explaining rising salt, and the two brief paragraphs dedicated to explaining this phenomenon leaves the reader a little disappointed. One or more diagrams and some further detailed explanation would have been appropriate because rising salt is one of the key issues addressed in the book. Similar comments are appropriate about the brief final section of the chapter dealing with how to use the knowledge of catchment hydrology outlined in preceding sections.

Chapter 3 outlines a recently developed catchment classification of local, intermediate and regional groundwater systems and then uses this classification system as the basis to assess how effective different tree planting systems are likely to be in controlling salinity. The case studies dealing with agroforestry and local and intermediate groundwater flow systems are a feature of this chapter.

A point made in many places in the book is that not all tree planting systems (described in the book as agroforestry designs) are equally effective and suitable for every catchment. Chapters 4 through 7 deal with four alternative agroforestry designs. Chapter 4 describes the growing of short-rotation woodlots on agricultural land in areas too dry for conventional forestry. The idea is presented of growing short rotation woodlots to exploit the reserves of water accumulated below crops and pastures. The modelling of four scenarios is used as the basis for this chapter. This modelling suggests that unused water left in the subsoil by crops or pastures can be tapped by a woodlot in a 'honeymoon' period leading to higher growth than what might normally be expected. A minor point of annoyance is the failure of the authors to explain what they believe to be 'conventional forestry' and how the systems discussed in the chapter differ from this.

Chapter 5 deals with how to maximize the effectiveness of tree belts on hillslopes. Specifically it provides guidance on where to plant tree belts, and on inter-belt spacing and tree belt width. The recommendations are based on balancing the supply of water to the belt and the consumption of water by the belt. The authors maintain that by careful planting design, tree growth per unit area of land will be optimized and leakage from the catchment will be reduced in the most efficient manner. Continuing on the theme of using tree belts, Chapter 6 deals with mixing tree belts with agriculture and the question of when is it better to plant trees in belts rather than in woodlots. In this chapter it is explained that trees planted in woodlots are limited to obtaining water from a soil area equivalent to their canopy since canopy cover is complete in a mature woodlot. On the other hand a tree that is planted in a

narrow shelter belt is set apart from others and can scavenge water from far beyond its canopy. The extra resources available for trees in shelter belts translates into higher grow rates and a greater reduction in leakage (deep drainage below the root zone) compared with trees in woodlots. In the chapter it is pointed out that trees planted in shelterbelts may however compete with crops and pasture for nutrients and water. Therefore the density and arrangement of trees is critically important for balancing agricultural productivity and the need to reduce leakage. The chapter draws on a number of experimental results to illustrate key points and to make recommendations on designing appropriate tree-planting systems.

Chapter 7 explores the case for agroforestry over shallow and often saline watertables where most forms of agriculture are financially unviable. The author points out that there is a great interest in establishing trees in such areas for the dual purpose of lowering watertables and increasing tree growth through groundwater uptake. Topics covered in this chapter include the effect of salt on tree water use and growth, the rate of groundwater use by trees, the sustainability of woodlots over saline watertables and tree-planting designs for regions with shallow watertables. Once again there are a number of excellent examples illustrating key points based on past research studies.

Chapters 8 and 9 are about implementing a revegetation strategy. Species selection and plantation management is discussed in Chapter 8. Information on the suitability of species for saline and non-saline sites under differing saline conditions is summarized. This chapter also outlines a number of management interventions. Chapter 9 summarises the revegetation options that are available and how they can be implemented at the catchment scale. It also sets out a five-strand framework for optimizing the role of trees in the fight against salinity.

A number of features incorporated into each chapter are worth further comment. A notable feature is the case studies which are included in most chapters. These are highly interesting and are well designed to illustrate key points as they relate to real-life examples. A second notable feature of the book is the large number of excellent diagrams, graphs and photographs which are used effectively to illustrate and explain material in the text. Another notable feature is the final section of each chapter on how to use the knowledge outlined in the preceding sections of the chapter.

In the Forward it is stated that the 'need to deliver a simple message about a complex problem was a challenge for us and the risk of oversimplification was a constant companion'. The authors and editors have done an excellent job in delivering this message and should be congratulated on achieving what was a particularly difficult task. The book is primarily pitched at land managers in Australia. It probably has limited appeal to those outside this market, although the general principles outlined would be of interest to some other market segments within Australia. Because the book provides an excellent outline of how small-scale forests can be designed to produce both wood and non-wood benefits, it is a useful reference for those in other countries with an interest in the field of the role of forestry in land protection and repair.

In conclusion, the book is a valuable contribution to studies of multipurpose small-scale woodlots grown on farm land. The text was well written and integrated with a large number of high quality photographs and diagrams. I have no hesitation

in recommending this book to anyone interested in the issue of rising salt levels and how trees, particularly those on farms, can be used to address this issue.

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